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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/750,341	12/31/2003	Christoph K. Hitzenger	ZEIS-2028	9461

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EXAMINER

TURNER, SAMUEL A

ART UNIT

PAPER NUMBER

2877

DATE MAILED: 02/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

4

Office Action Summary	Application No.	Applicant(s)	
	10/750,341	HITZENBERGER, CHRISTOPH K.	
	Examiner	Art Unit	
	Samuel A. Turner	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 September 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 16-20 and 30 is/are allowed.
- 6) ☒ Claim(s) 1, 9-15 and 21-29 is/are rejected.
- 7) ☒ Claim(s) 2-8 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>5/3/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

Claims 5 and 12 are objected to under 37 CFR 1.75(c) as being in improper form because these claims fail to end with a period. Correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 21-29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 21 and 26, the phrase “comprising the unordered steps of” is confusing. If the steps are unordered how can an output signal be produced before the source illumination is produced ?

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 10, 12-15, and 21 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Biegen(4,869,593).

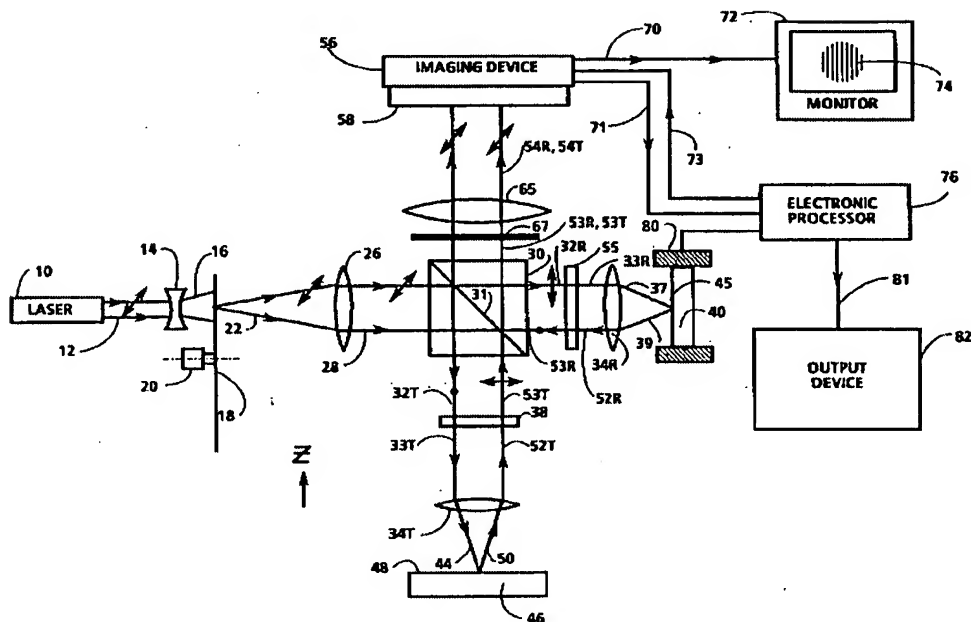


FIGURE 3

With regard to claim 1, Biegen teaches a interference surface profiler system comprising:

an interferometer (figure 3) having a reference arm (45, 55) and a sample arm (38, 48) each having an optical path, the sample arm being disposed such that a test sample (46) reflects a sample portion $R_s(52T)$ of an incident optical signal $S_s(33T)$ along the sample arm optical path;

a reflector (45) disposed in the reference arm to reflect a reference portion $R_R(52R)$ of an incident optical signal $S_R(33R)$ along the reference arm optical path;

a source (10, 18) for producing an optical source signal $S(28)$ having a short coherence length (column 4, line 68) and a first polarization state;

a polarizing beam splitter(30) disposed to direct portions of the optical source signal S along the reference arm optical path and the sample arm optical path;

a first polarizing element(67) disposed to select, from the returning reference and sample portions (R_R+R_S), a detector component $S_D(54R,54T)$ having a second polarization state; and

a detector(58) disposed to produce an output signal V_D representing the optical signal intensity I_D of the detector component S_D , wherein the second polarization state is related to the first polarization state such that the detector operates in a noise-optimized regime.

As to claim 10, wherein the interferometer is a Michelson interferometer(**figure 3**).

As to claim 12 further comprising:

a second polarizing element(38) disposed in the sample arm optical path such that the returning sample portion R_S is directed by the polarizing beam splitter to the detector.

As to claim 13, further comprising:

a second polarizing element(55) disposed in the reference arm optical path such that the returning reference portion R_R is directed by the polarizing beam splitter to the detector.

As to claim 14, further comprising:

in the detector, a plurality of optical transducers(56) each disposed to produce an electrical signal responsive to the detector component S_D .

As to claim 15 wherein the second polarization state is related to the first polarization state(54R,54T) such that the detector operates in a shot-noise limited regime.

With regard to claim 21, Biegen teaches a method comprising the steps of:

- (a) producing an optical source signal S having a short coherence length and a first polarization state(column 7, line 27- column 8, line 39);
- (b) directing a first portion S_R of the optical source signal S along a reference arm optical path and directing a second portion S_S of the optical source signal S along a sample arm optical path(column 7, line 27- column 8, line 39);
- (c) reflecting a reference portion R_R of the first portion S_R along the reference arm optical path(column 7, line 27- column 8, line 39);
- (d) selecting, from the returning reference and sample portions (R_R+S_S), a detector component S_D having a second polarization state(column 7, line 27- column 8, line 39); and
- (e) producing an output signal V_D representing the optical signal intensity I_D of the detector component S_D , wherein the second polarization state is related to the first polarization state such that the detector operates in a noise-optimized regime(column 7, line 27- column 8, line 39).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Biegen(4,869,593).

Besides Mirau, Michelson, and Linnik(a type of Michelson), Biegen teaches that any two-beam interferometer can be used(column 10, line 33).

Official notice is taken that a Mach-Zehnder is a well known two-beam interferometer. See In re Malcom, 1942 C.D 589; 543 O.G. 440.

If applicant does not traverse the examiner's assertion of official notice or applicant's traverse is not adequate, the next Office action will indicate that the common knowledge or well-known in the art statement is taken to be admitted prior art because applicant either failed to traverse the examiner's assertion of official notice or that the traverse was inadequate.

With regard to claim 11, it would have been obvious to substitute any two-beam interferometer for the two-beam interferometer of Biegen; column 10, line 33.

Claims 9 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Biegen(4,869,593) in view of Swanson et al(5,321,501).

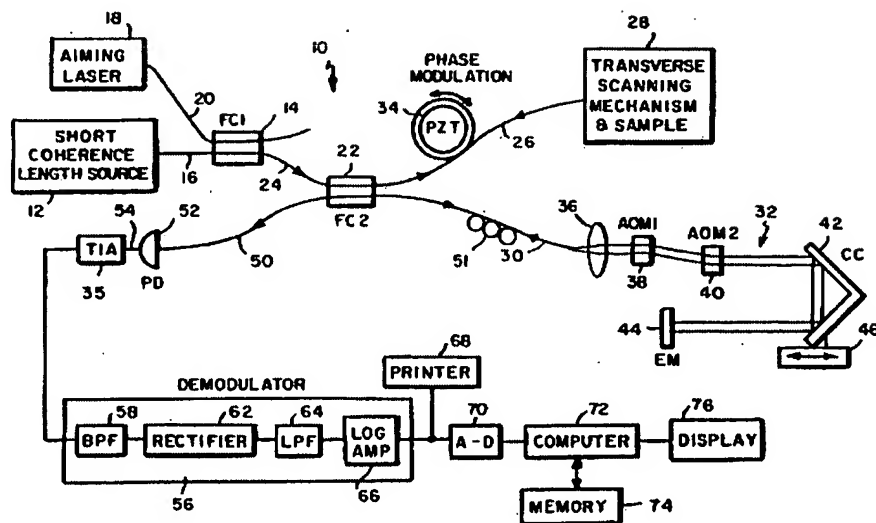


FIG. 1A

As to claims 9 and 25, Biegen teaches moving the reflector along the reference arm optical path by (column 8, lines 31-36) a reflector motor (80) disposed to move the reflector (45) along the reference arm optical path. Biegen however fails to teach any form of surface scanning.

Swanson teaches a transverse scanning mechanism 28 positioned in the measurement arm in order to scan the entire area of interest.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Biegen by including a transverse scanning mechanism either in the measurement arm or in the stage which holds the sample in order to profile samples larger than the image size of the interferometer.

Allowable Subject Matter

Claims 16-20, and 30 are allowed in view of the prior art of record.

Claims 2-8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 26-29 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.

Claims 22-24 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

With specific regard to claims 2, 16, 22, 26, and 30, the prior art of record fails to teach: a first filter/step of filtering for separating from the output signal V_D , a low-frequency component V_L representing a scanning laser ophthalmoscope-like (SLO-like) image pixel;

first data storage means/step for storing a plurality of pixels $[V_H]$ representing a two-dimensional (2D) OCT en face image; and

second data storage means/step for storing a plurality of pixels $[V_L]$ representing a 2D SLO-like image; and

processing means/step for removing motion artifacts from 2D OCT en face image data in accordance with the corresponding SLO-like image data.

Relevant Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ohuchi(4,798,468) is cited because it teaches another polarized Michelson interferometer having a short coherence length source. Fercher(5,847,827) teaches a polarization OCT arrangement.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samuel A. Turner whose phone number is 571-272-2432.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr., can be reached on 571-272-2800 ext. 77.

The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Samuel A. Turner
Primary Examiner
Art Unit 2877